FIG. 1

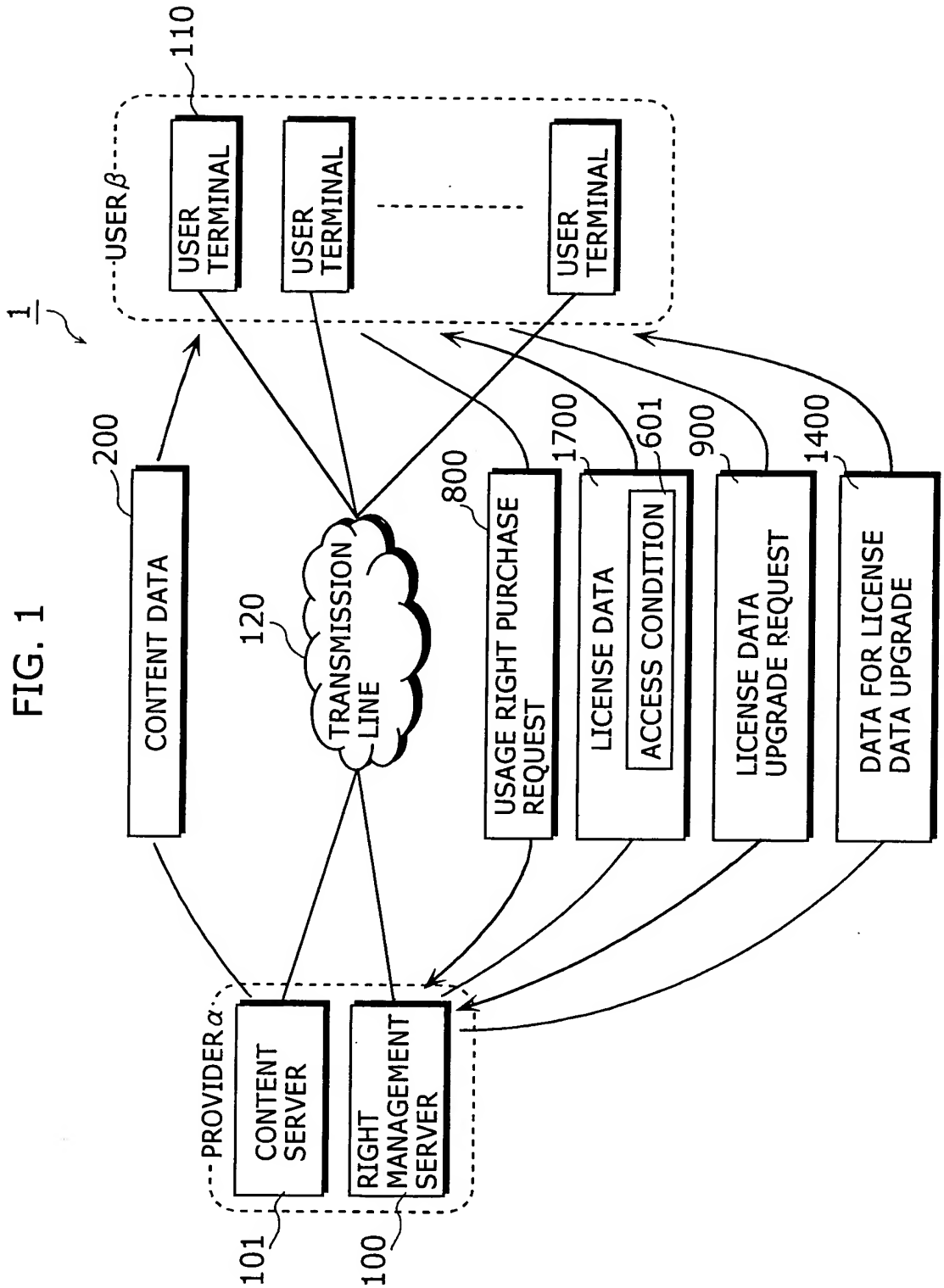

1
USER β
110
USER TERMINAL
USER TERMINAL
USER TERMINAL
200
CONTENT DATA
120
TRANSMISSION LINE
800
USAGE RIGHT PURCHASE REQUEST
1700
LICENSE DATA
ACCESS CONDITION
601
900
LICENSE DATA UPGRADE REQUEST
1400
DATA FOR LICENSE DATA UPGRADE
PROVIDER α
CONTENT SERVER
RIGHT MANAGEMENT SERVER
101
100

FIG. 2

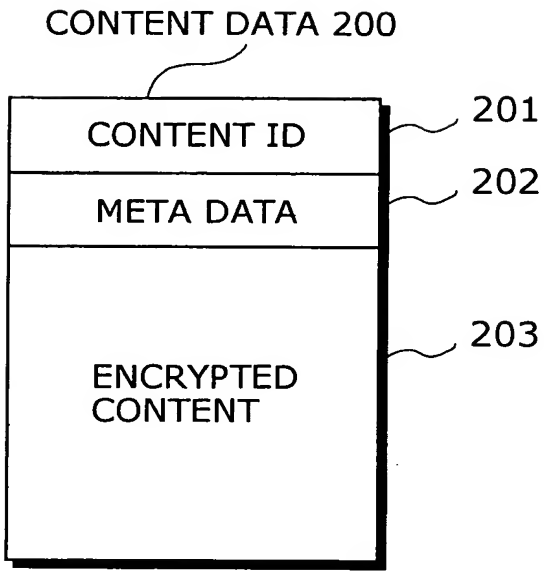

CONTENT DATA 200
CONTENT ID
META DATA
ENCRYPTED CONTENT
201
202
203

FIG. 3

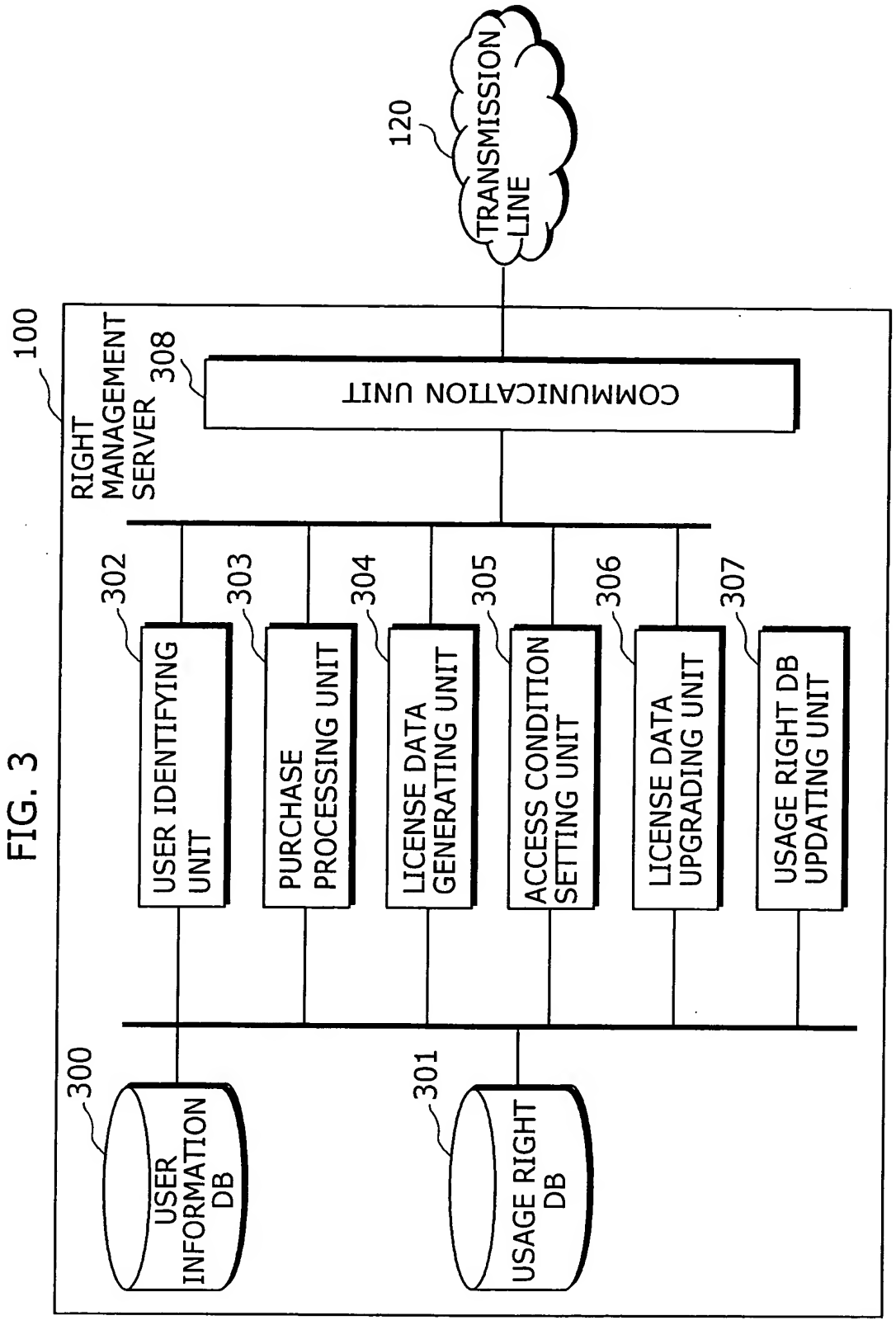

120
TRANSMISSION LINE
100
RIGHT MANAGEMENT SERVER
308
COMMUNICATION UNIT
302
USER IDENTIFYING UNIT
303
PURCHASE PROCESSING UNIT
304
LICENSE DATA GENERATING UNIT
305
ACCESS CONDITION SETTING UNIT
306
LICENSE DATA UPGRADING UNIT
307
USAGE RIGHT DB UPDATING UNIT
300
USER INFORMATION DB
301
USAGE RIGHT DB

FIG. 4

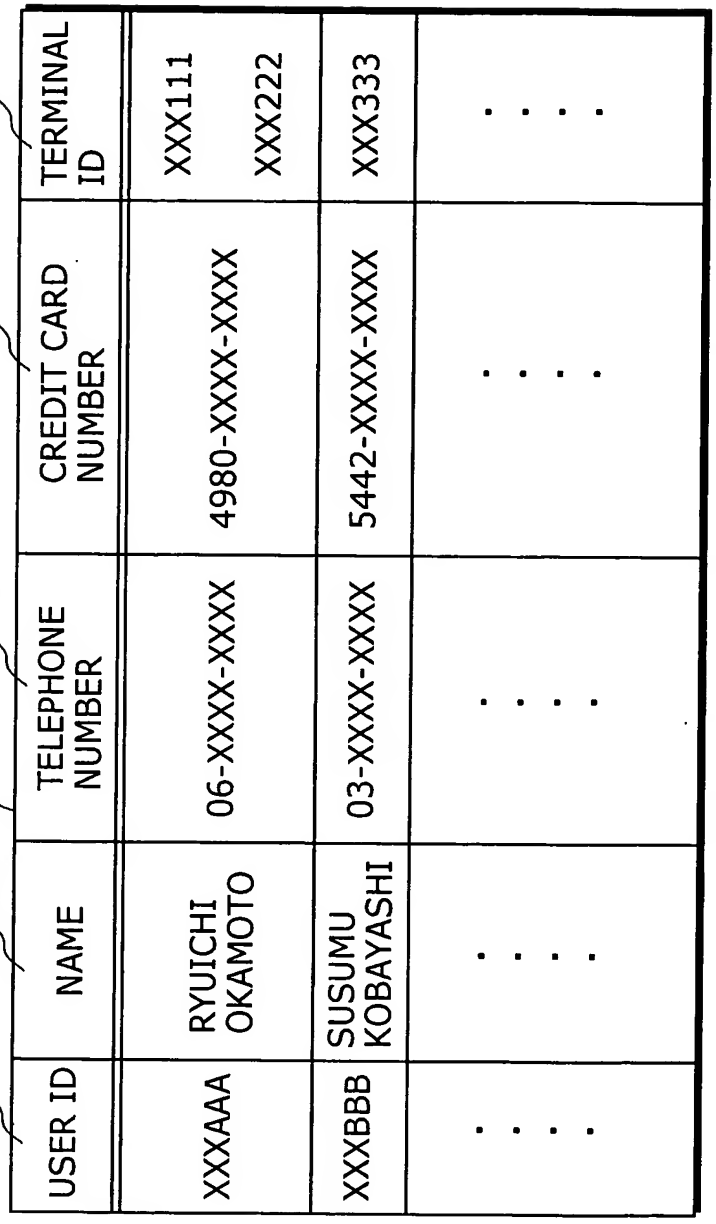

USER INFORMATION DB300
400
401
402
403
404
USER ID
NAME
TELEPHONE NUMBER
CREDIT CARD NUMBER
TERMINAL ID
XXXAAA
RYUICHI OKAMOTO
06-XXXX-XXXX
4980-XXXX-XXXX
XXX111
XXX222
XXXBBB
SUSUMU KOBAYASHI
03-XXXX-XXXX
5442-XXXX-XXXX
XXX333

FIG. 5

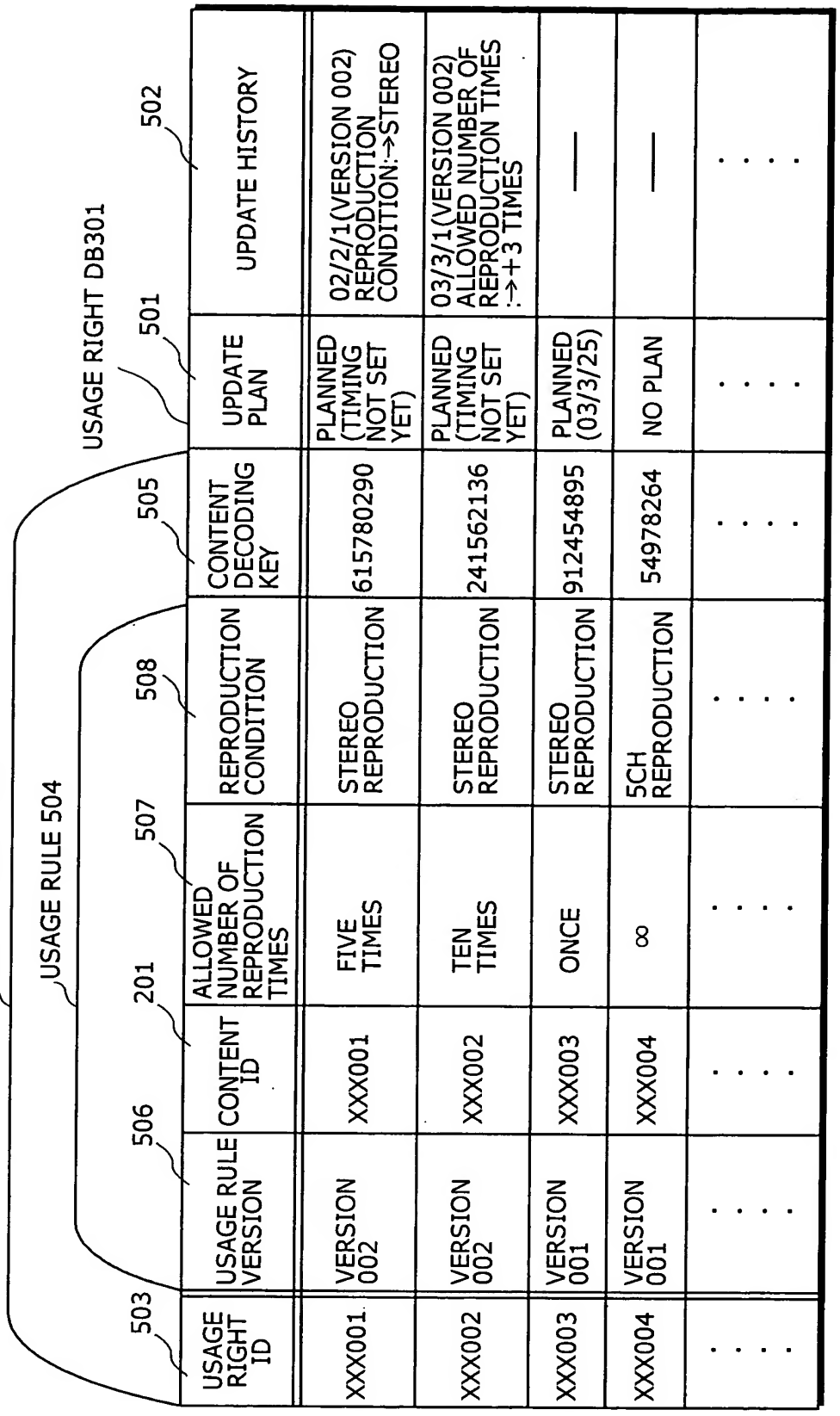
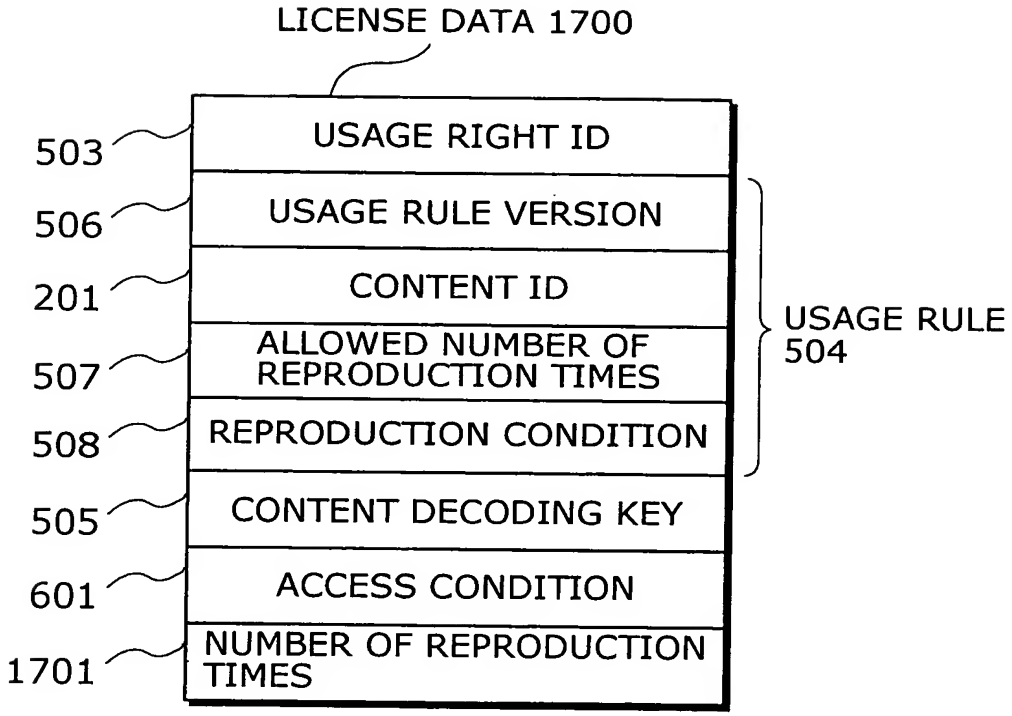

USAGE RIGHT 500
USAGE RULE 504
USAGE RIGHT DB301
503
506
201
507
508
505
501
502
USAGE RIGHT ID
USAGE RULE VERSION
CONTENT ID
ALLOWED NUMBER OF REPRODUCTION TIMES
REPRODUCTION CONDITION
CONTENT DECODING KEY
UPDATE PLAN
UPDATE HISTORY
XXX001
VERSION 002
XXX001
FIVE TIMES
STEREO REPRODUCTION
615780290
PLANNED (TIMING NOT SET YET)
02/2/1(VERSION 002) REPRODUCTION CONDITION:→STEREO
XXX002
VERSION 002
XXX002
TEN TIMES
STEREO REPRODUCTION
241562136
PLANNED (TIMING NOT SET YET)
03/3/1(VERSION 002) ALLOWED NUMBER OF REPRODUCTION TIMES :→+3 TIMES
XXX003
VERSION 001
XXX003
ONCE
STEREO REPRODUCTION
912454895
PLANNED (03/3/25)
—
XXX004
VERSION 001
XXX004
∞
5CH REPRODUCTION
54978264
NO PLAN
—

FIG. 6


LICENSE DATA 1700
503
USAGE RIGHT ID
506
USAGE RULE VERSION
201
CONTENT ID
507
ALLOWED NUMBER OF REPRODUCTION TIMES
508
REPRODUCTION CONDITION
USAGE RULE 504
505
CONTENT DECODING KEY
601
ACCESS CONDITION
1701
NUMBER OF REPRODUCTION TIMES

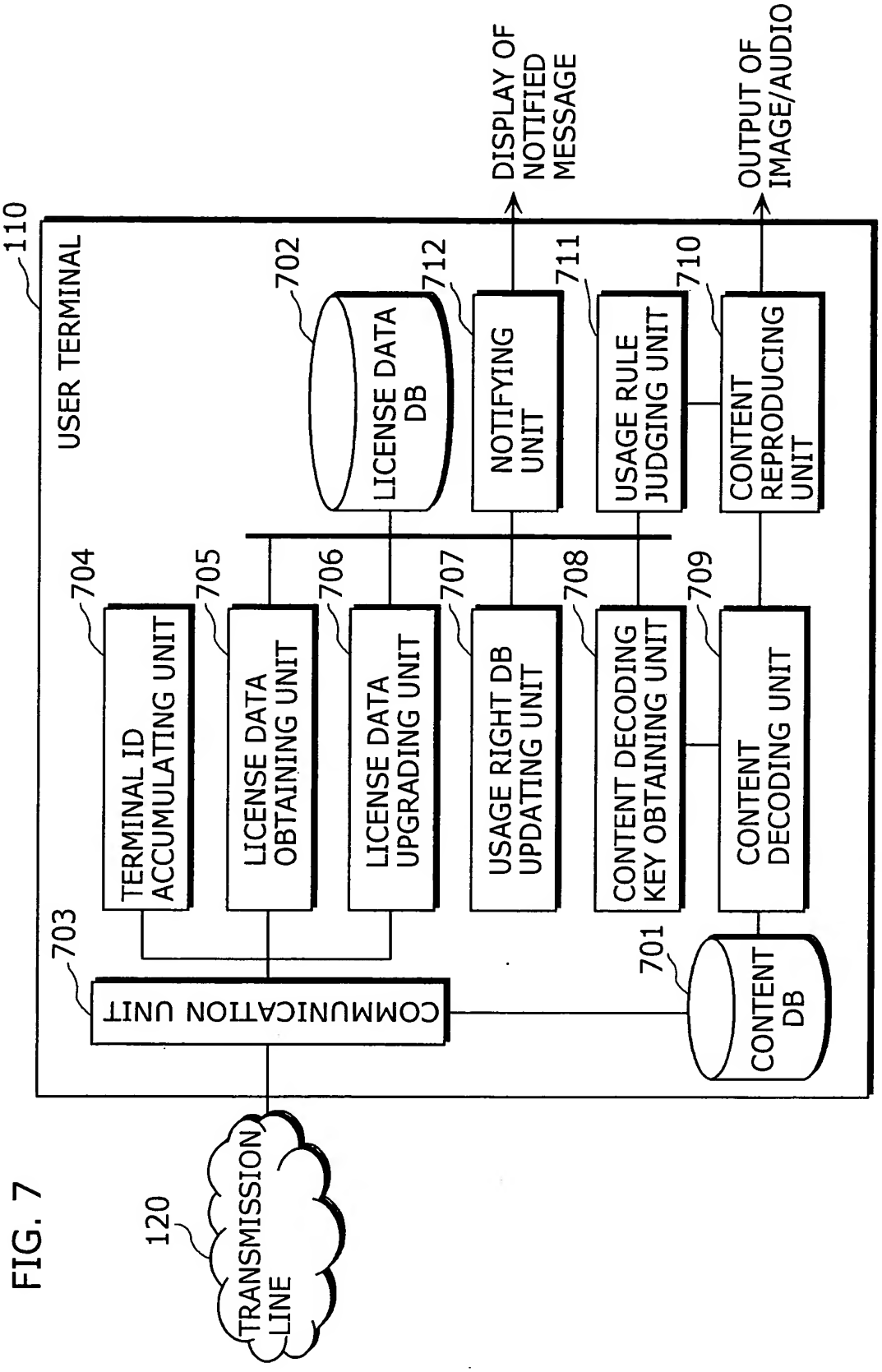

110
USER TERMINAL
DISPLAY OF NOTIFIED MESSAGE
OUTPUT OF IMAGE/AUDIO
702
LICENSE DATA DB
712
NOTIFYING UNIT
711
USAGE RULE JUDGING UNIT
710
CONTENT REPRODUCING UNIT
704
TERMINAL ID ACCUMULATING UNIT
705
LICENSE DATA OBTAINING UNIT
706
LICENSE DATA UPGRADING UNIT
707
USAGE RIGHT DB UPDATING UNIT
708
CONTENT DECODING KEY OBTAINING UNIT
709
CONTENT DECODING UNIT
703
COMMUNICATION UNIT
701
CONTENT DB
120
TRANSMISSION LINE

FIG. 7

FIG. 8

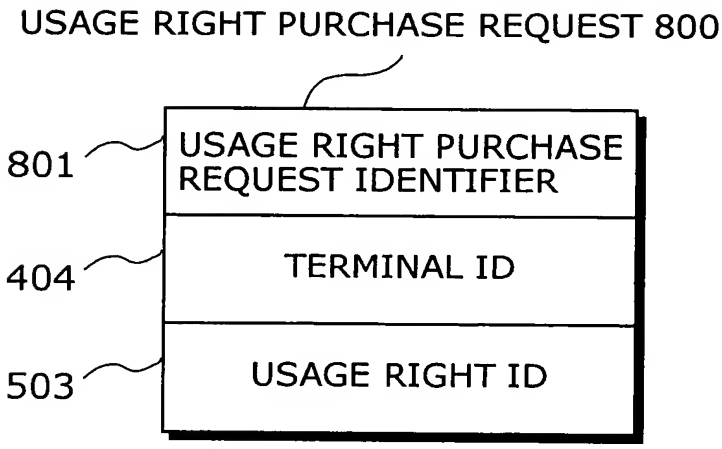

USAGE RIGHT PURCHASE REQUEST 800
801
USAGE RIGHT PURCHASE REQUEST IDENTIFIER
404
TERMINAL ID
503
USAGE RIGHT ID

FIG. 9

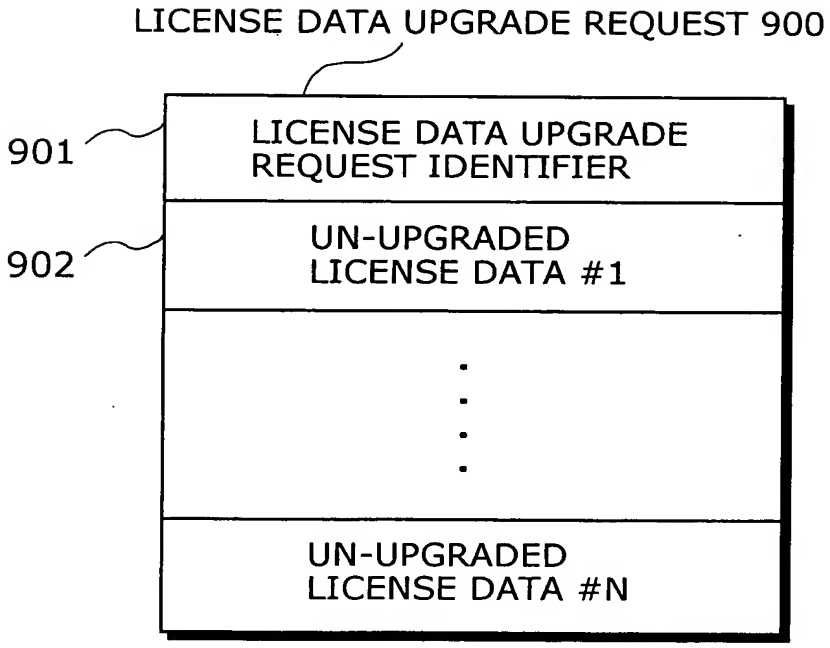

LICENSE DATA UPGRADE REQUEST 900
901
LICENSE DATA UPGRADE REQUEST IDENTIFIER
902
UN-UPGRADED LICENSE DATA #1
UN-UPGRADED LICENSE DATA #N

FIG. 10

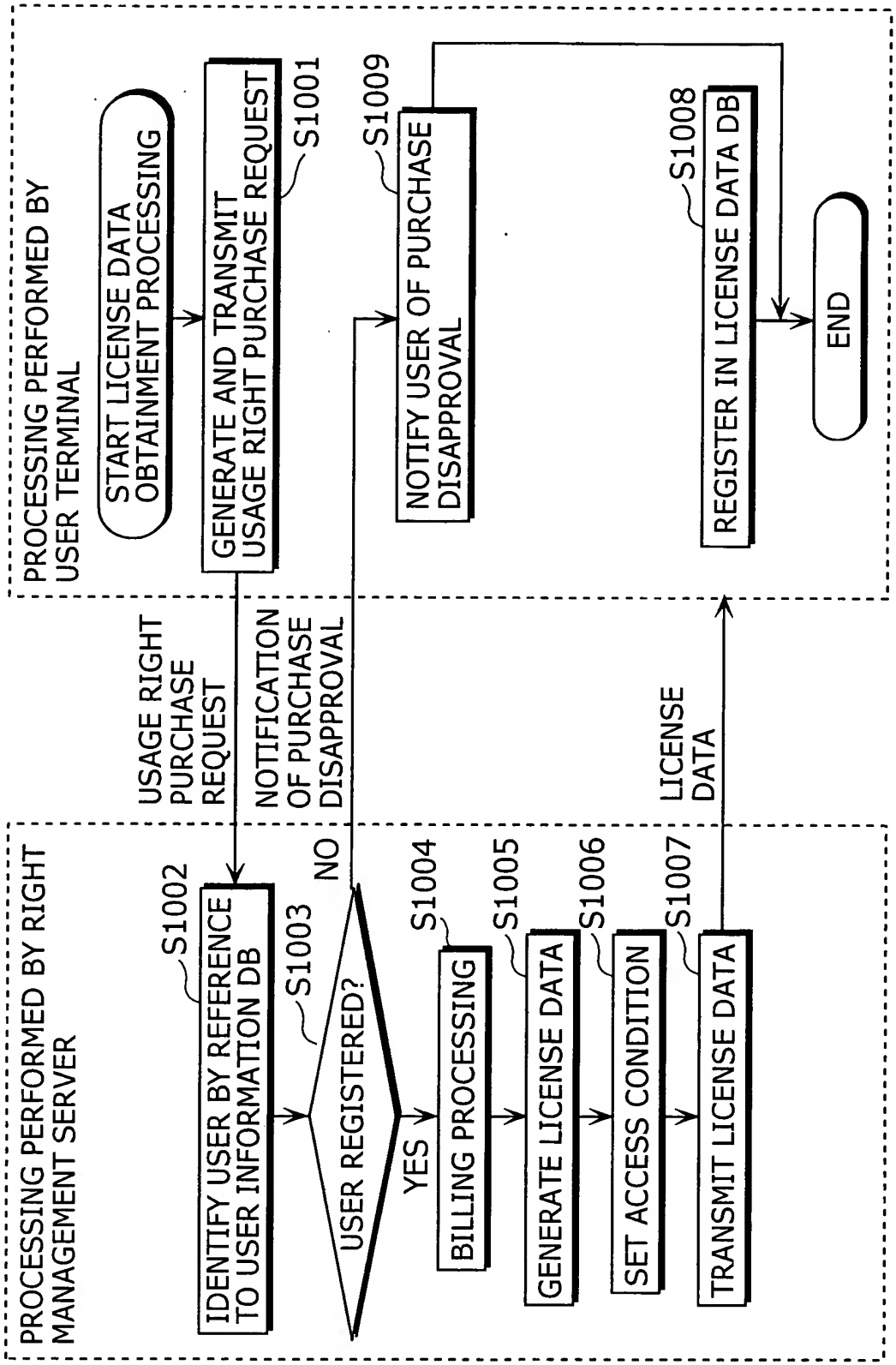

PROCESSING PERFORMED BY USER TERMINAL
START LICENSE DATA OBTAINMENT PROCESSING
GENERATE AND TRANSMIT USAGE RIGHT PURCHASE REQUEST
S1001
NOTIFY USER OF PURCHASE DISAPPROVAL
S1009
REGISTER IN LICENSE DATA DB
S1008
END
USAGE RIGHT PURCHASE REQUEST
NOTIFICATION OF PURCHASE DISAPPROVAL
LICENSE DATA
PROCESSING PERFORMED BY RIGHT MANAGEMENT SERVER
S1002
IDENTIFY USER BY REFERENCE TO USER INFORMATION DB
S1003
USER REGISTERED?
NO
YES
S1004
BILLING PROCESSING
S1005
GENERATE LICENSE DATA
S1006
SET ACCESS CONDITION
S1007
TRANSMIT LICENSE DATA

FIG. 11

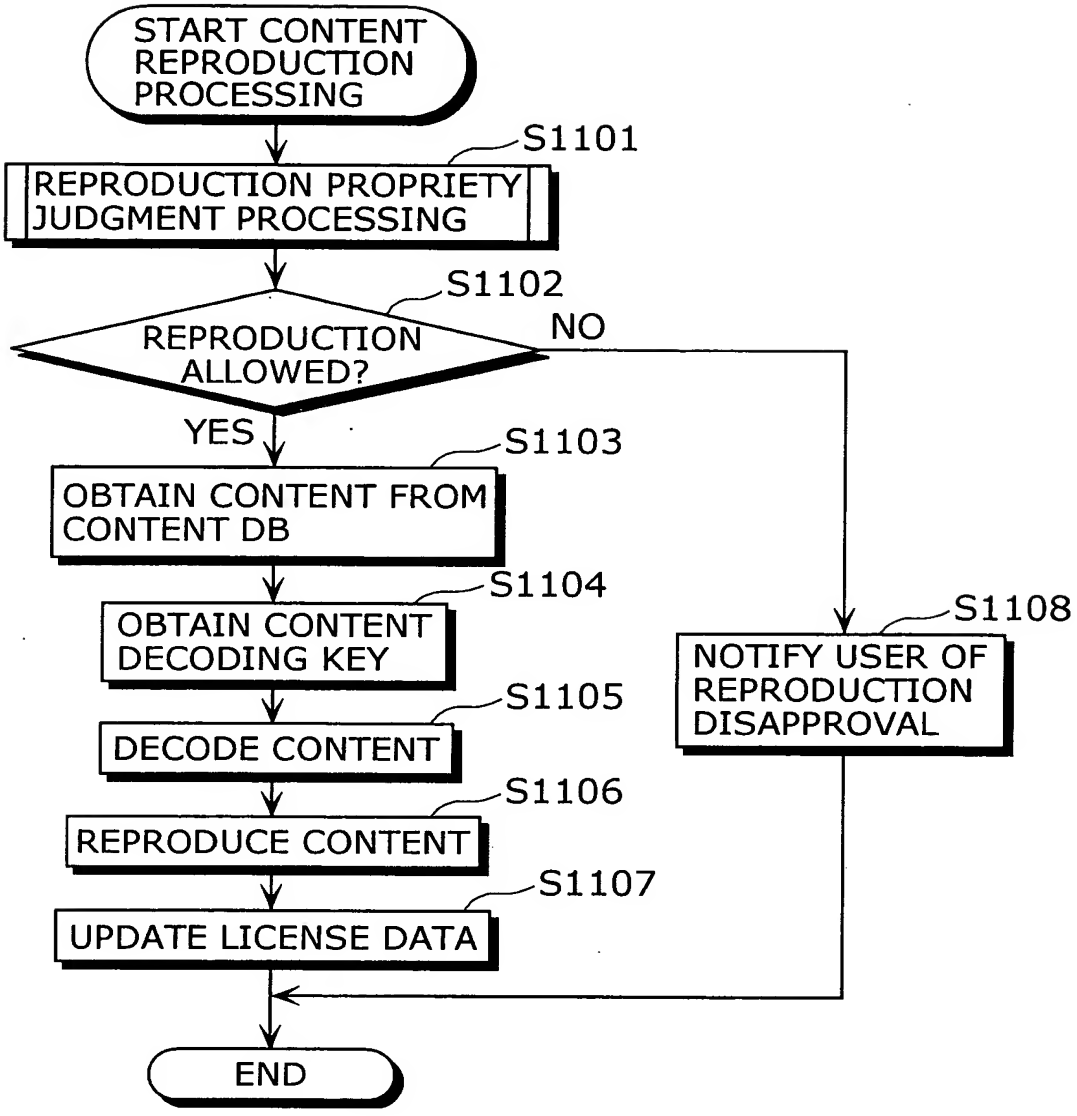

START CONTENT REPRODUCTION PROCESSING
S1101
REPRODUCTION PROPRIETY JUDGMENT PROCESSING
S1102
REPRODUCTION ALLOWED?
NO
YES
S1103
OBTAIN CONTENT FROM CONTENT DB
S1104
OBTAIN CONTENT DECODING KEY
S1105
DECODE CONTENT
S1106
REPRODUCE CONTENT
S1107
UPDATE LICENSE DATA
S1108
NOTIFY USER OF REPRODUCTION DISAPPROVAL
END

FIG. 12

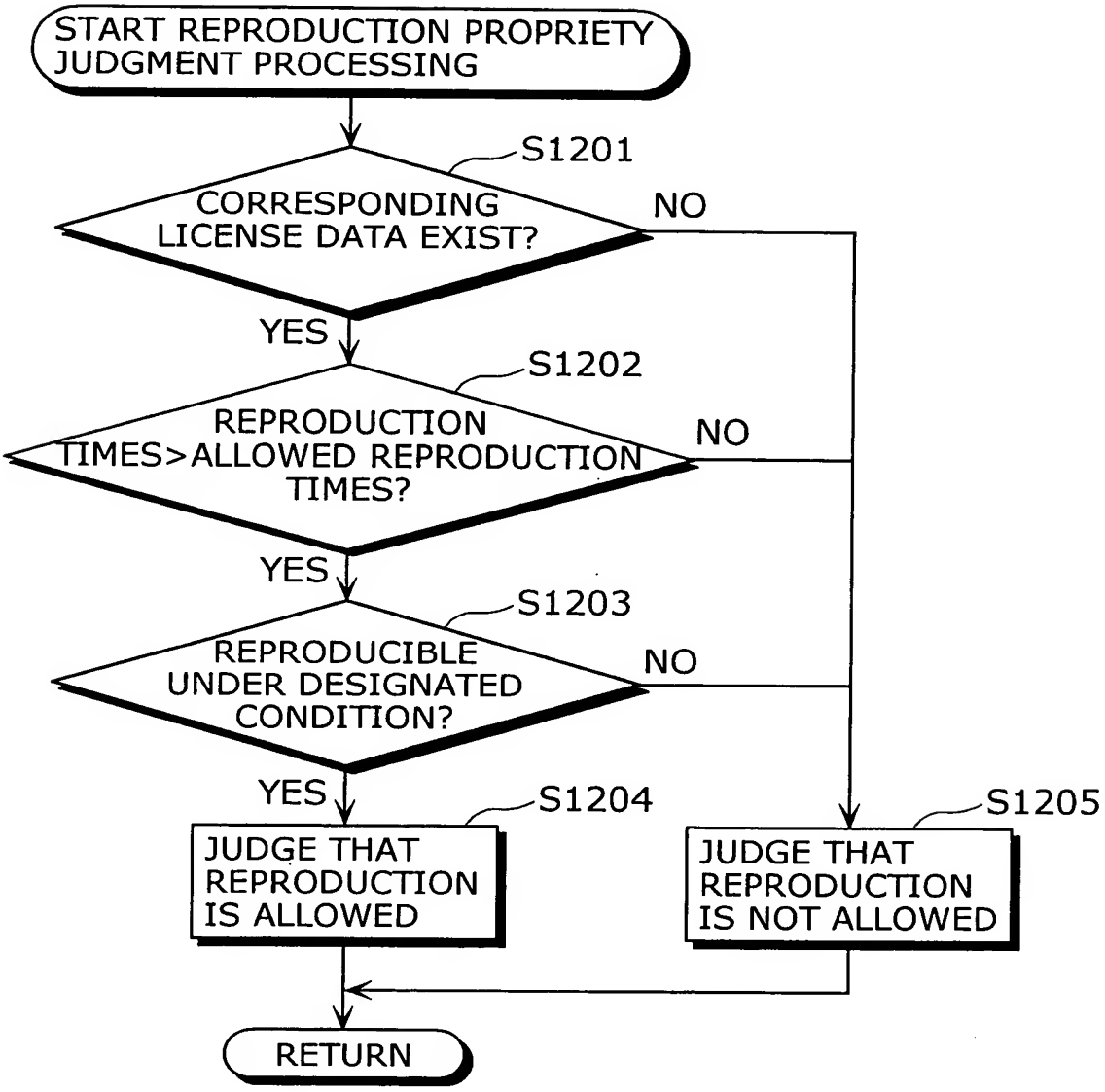

START REPRODUCTION PROPRIETY JUDGMENT PROCESSING
S1201
CORRESPONDING LICENSE DATA EXIST?
NO
YES
S1202
REPRODUCTION TIMES>ALLOWED REPRODUCTION TIMES?
NO
YES
S1203
REPRODUCIBLE UNDER DESIGNATED CONDITION?
NO
YES
S1204
JUDGE THAT REPRODUCTION IS ALLOWED
S1205
JUDGE THAT REPRODUCTION IS NOT ALLOWED
RETURN

FIG. 13

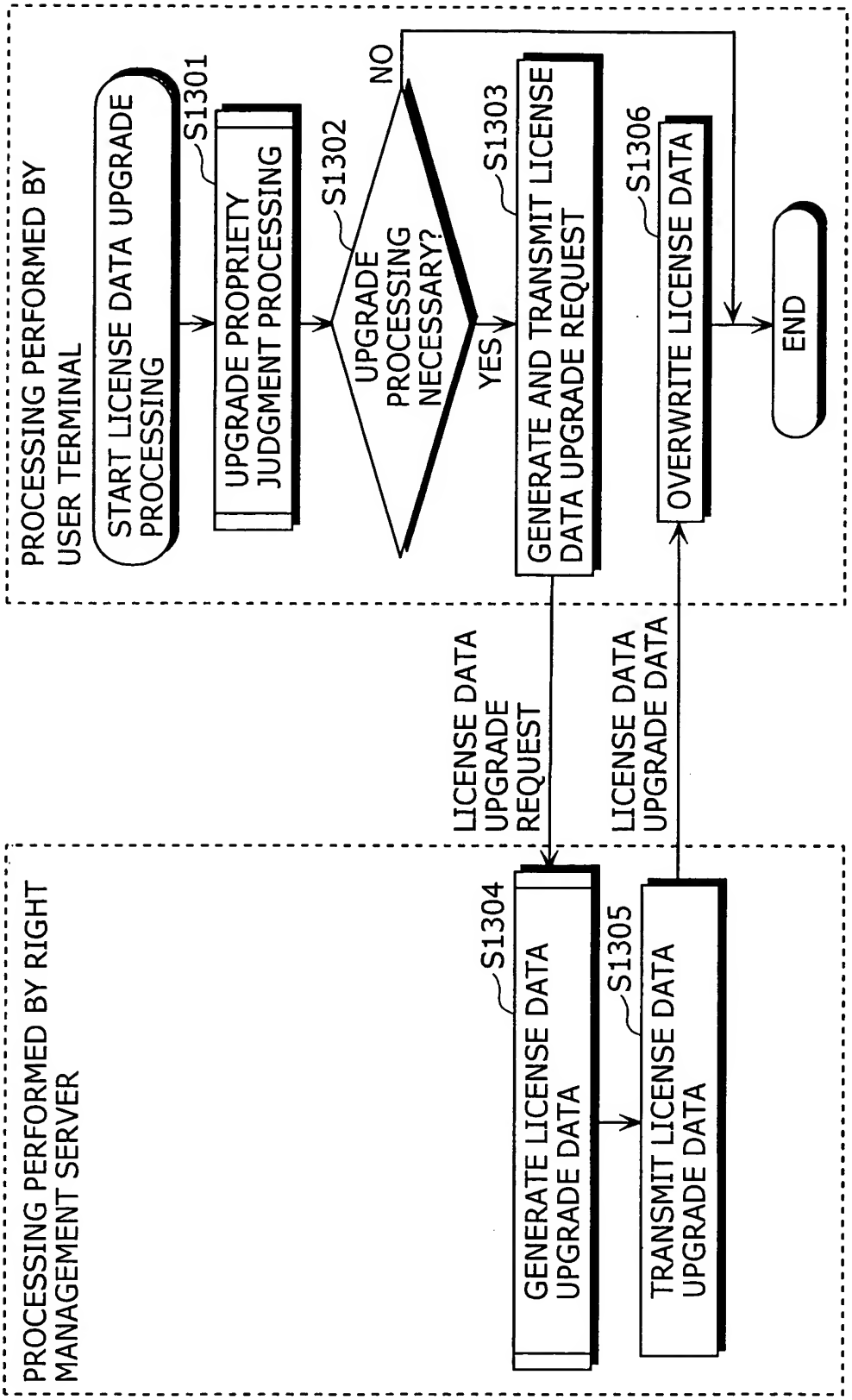

PROCESSING PERFORMED BY USER TERMINAL
START LICENSE DATA UPGRADE PROCESSING
S1301
UPGRADE PROPRIETY JUDGMENT PROCESSING
S1302
UPGRADE PROCESSING NECESSARY?
NO
YES
S1303
GENERATE AND TRANSMIT LICENSE DATA UPGRADE REQUEST
S1306
OVERWRITE LICENSE DATA
END
LICENSE DATA UPGRADE REQUEST
LICENSE DATA UPGRADE DATA
PROCESSING PERFORMED BY RIGHT MANAGEMENT SERVER
S1304
GENERATE LICENSE DATA UPGRADE DATA
S1305
TRANSMIT LICENSE DATA UPGRADE DATA

FIG. 14

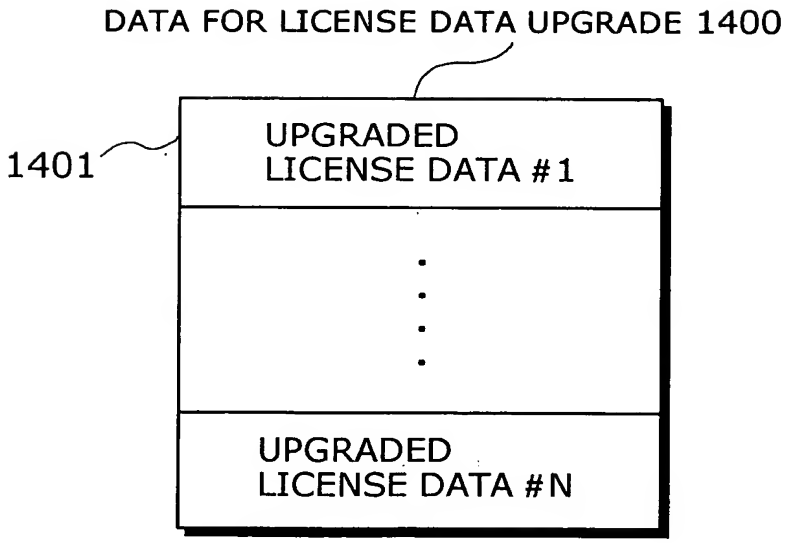

DATA FOR LICENSE DATA UPGRADE 1400
1401
UPGRADED LICENSE DATA #1
UPGRADED LICENSE DATA #N

FIG. 15

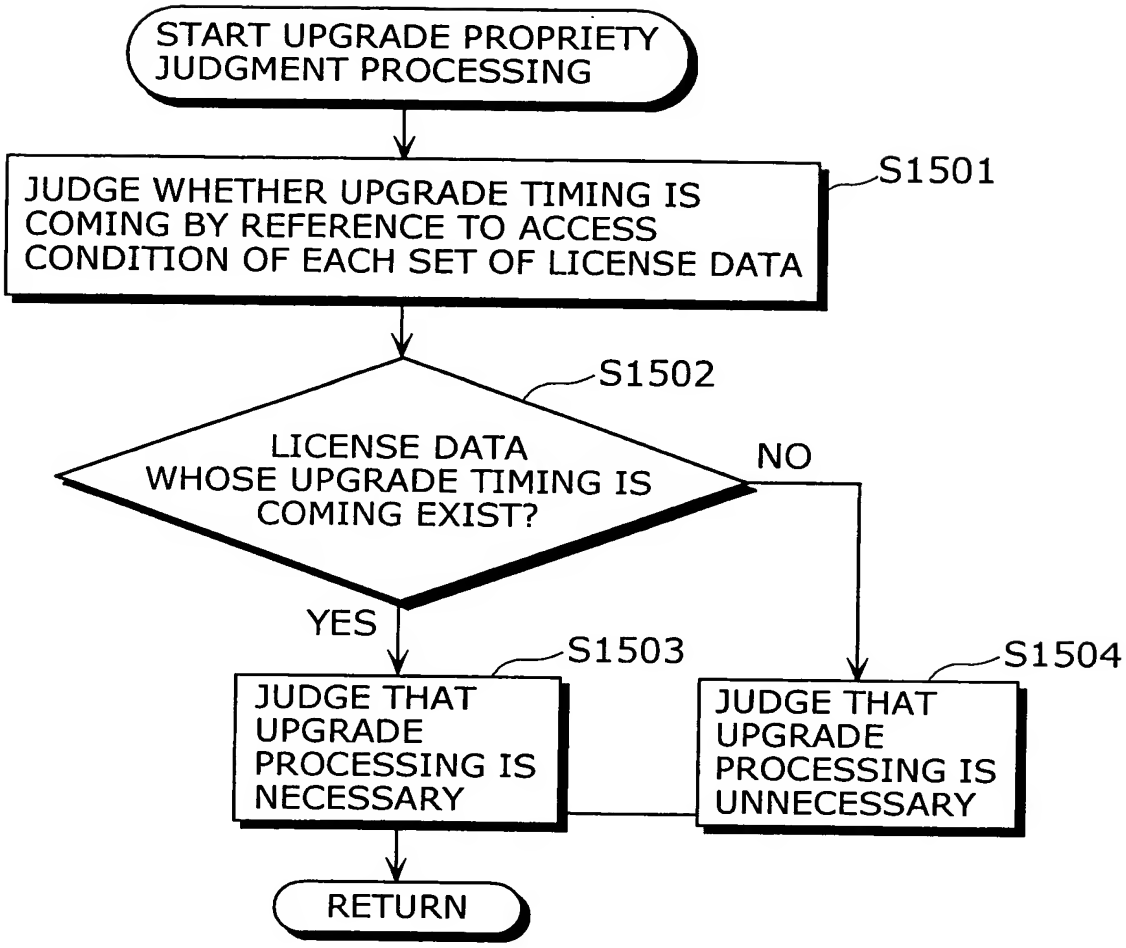

START UPGRADE PROPRIETY JUDGMENT PROCESSING
JUDGE WHETHER UPGRADE TIMING IS COMING BY REFERENCE TO ACCESS CONDITION OF EACH SET OF LICENSE DATA
S1501
S1502
LICENSE DATA WHOSE UPGRADE TIMING IS COMING EXIST?
NO
YES
S1503
JUDGE THAT UPGRADE PROCESSING IS NECESSARY
S1504
JUDGE THAT UPGRADE PROCESSING IS UNNECESSARY
RETURN

FIG. 16

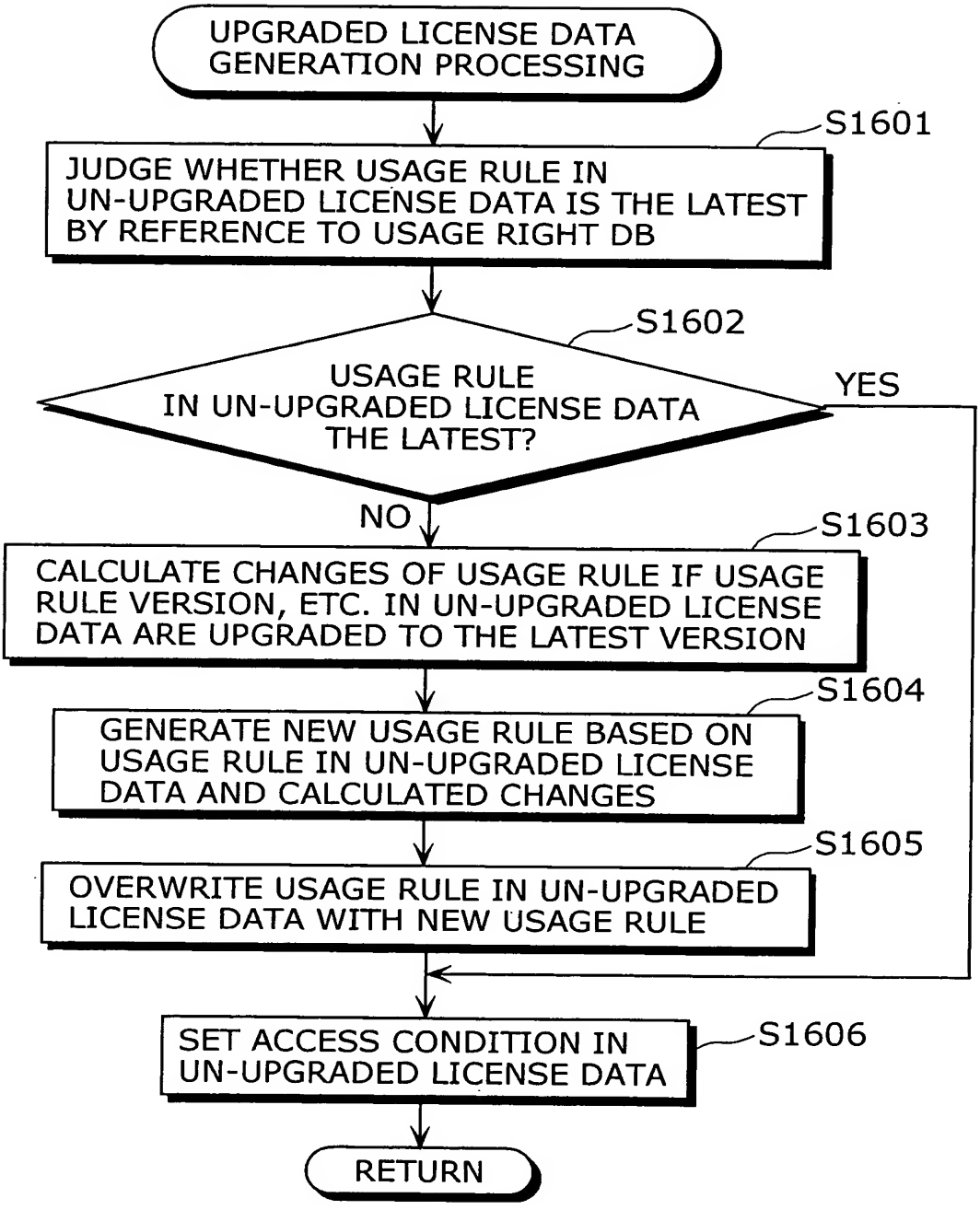

UPGRADED LICENSE DATA GENERATION PROCESSING
S1601
JUDGE WHETHER USAGE RULE IN UN-UPGRADED LICENSE DATA IS THE LATEST BY REFERENCE TO USAGE RIGHT DB
S1602
USAGE RULE IN UN-UPGRADED LICENSE DATA THE LATEST?
YES
NO
S1603
CALCULATE CHANGES OF USAGE RULE IF USAGE RULE VERSION, ETC. IN UN-UPGRADED LICENSE DATA ARE UPGRADED TO THE LATEST VERSION
S1604
GENERATE NEW USAGE RULE BASED ON USAGE RULE IN UN-UPGRADED LICENSE DATA AND CALCULATED CHANGES
S1605
OVERWRITE USAGE RULE IN UN-UPGRADED LICENSE DATA WITH NEW USAGE RULE
SET ACCESS CONDITION IN UN-UPGRADED LICENSE DATA
S1606
RETURN

FIG. 17

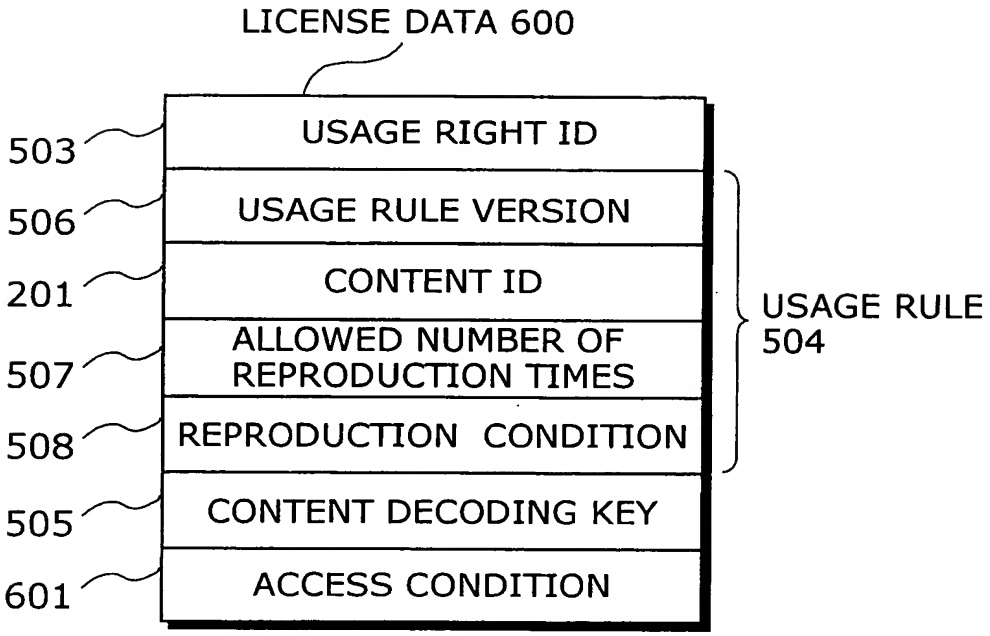

LICENSE DATA 600
503
USAGE RIGHT ID
506
USAGE RULE VERSION
201
CONTENT ID
507
ALLOWED NUMBER OF REPRODUCTION TIMES
508
REPRODUCTION CONDITION
505
CONTENT DECODING KEY
601
ACCESS CONDITION
USAGE RULE 504

FIG. 18

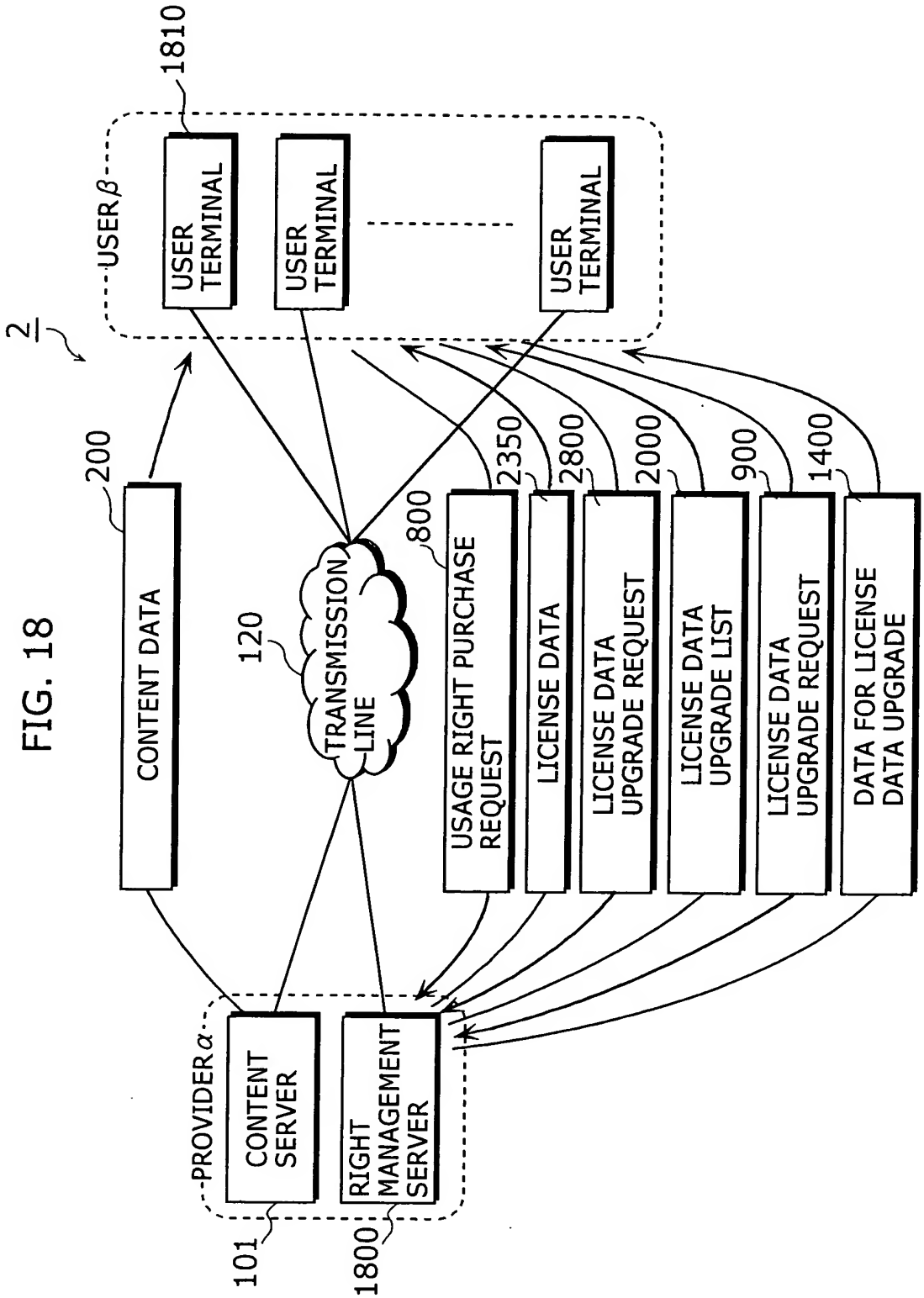

2
USER β
1810
USER TERMINAL
USER TERMINAL
USER TERMINAL
200
CONTENT DATA
120
TRANSMISSION LINE
800
USAGE RIGHT PURCHASE REQUEST
2350
LICENSE DATA
2800
LICENSE DATA UPGRADE REQUEST
2000
LICENSE DATA UPGRADE LIST
900
LICENSE DATA UPGRADE REQUEST
1400
DATA FOR LICENSE DATA UPGRADE
PROVIDER α
CONTENT SERVER
RIGHT MANAGEMENT SERVER
101
1800

FIG. 19

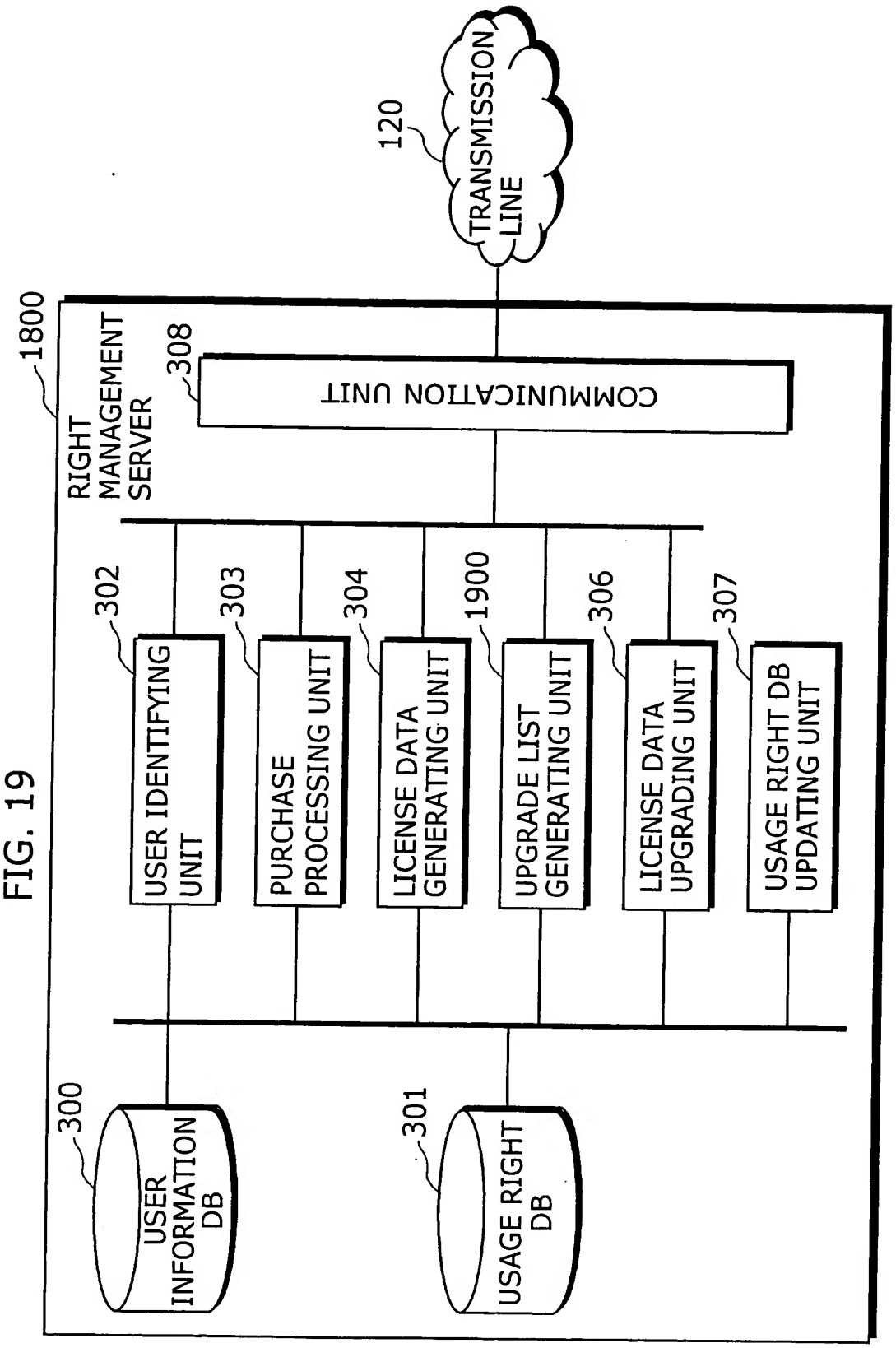

120
TRANSMISSION LINE
1800
RIGHT MANAGEMENT SERVER
308
COMMUNICATION UNIT
302
USER IDENTIFYING UNIT
303
PURCHASE PROCESSING UNIT
304
LICENSE DATA GENERATING UNIT
1900
UPGRADE LIST GENERATING UNIT
306
LICENSE DATA UPGRADING UNIT
307
USAGE RIGHT DB UPDATING UNIT
300
USER INFORMATION DB
301
USAGE RIGHT DB

FIG. 20

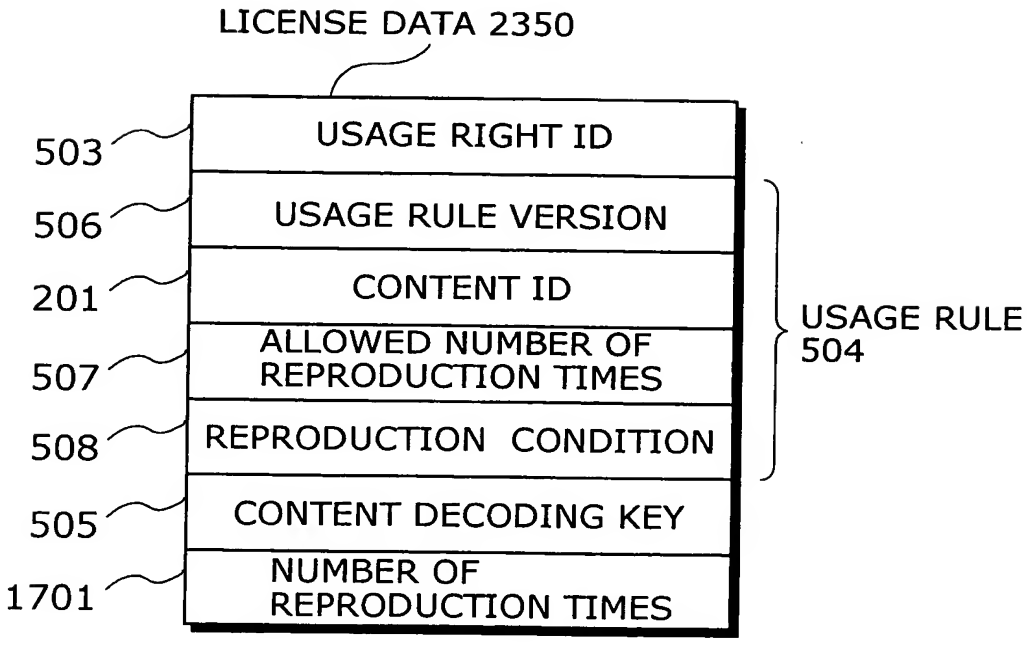

LICENSE DATA 2350
503
USAGE RIGHT ID
506
USAGE RULE VERSION
201
CONTENT ID
507
ALLOWED NUMBER OF REPRODUCTION TIMES
508
REPRODUCTION CONDITION
USAGE RULE 504
505
CONTENT DECODING KEY
1701
NUMBER OF REPRODUCTION TIMES

FIG. 21

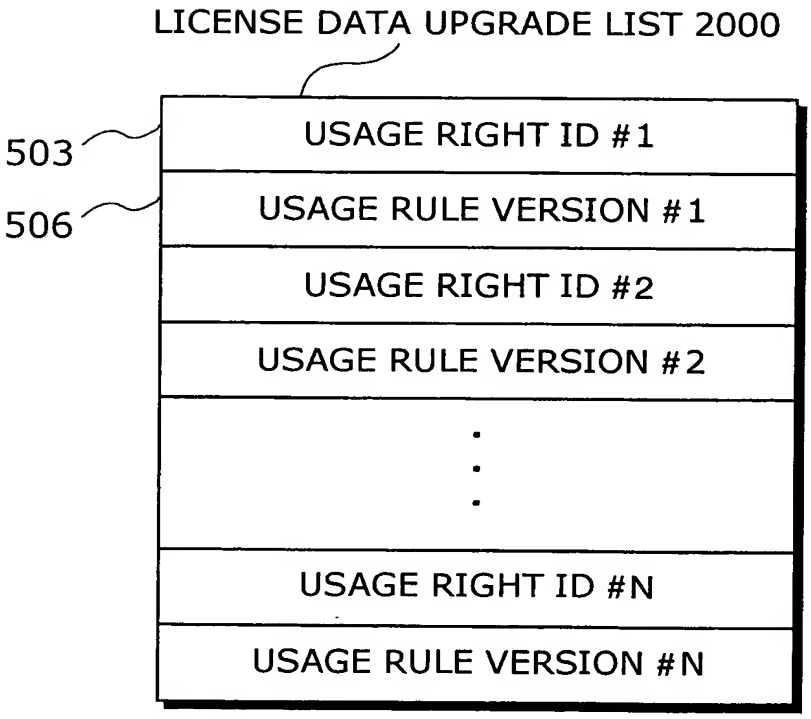
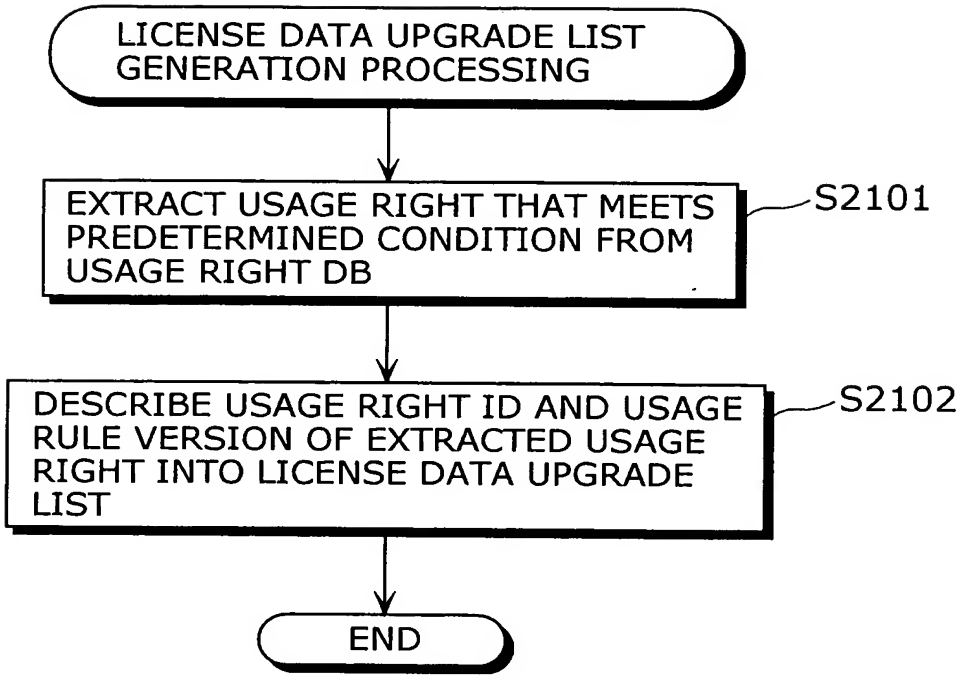

LICENSE DATA UPGRADE LIST 2000
503
506
USAGE RIGHT ID #1
USAGE RULE VERSION #1
USAGE RIGHT ID #2
USAGE RULE VERSION #2
USAGE RIGHT ID #N
USAGE RULE VERSION #N

FIG. 22


LICENSE DATA UPGRADE LIST GENERATION PROCESSING
EXTRACT USAGE RIGHT THAT MEETS PREDETERMINED CONDITION FROM USAGE RIGHT DB
S2101
DESCRIBE USAGE RIGHT ID AND USAGE RULE VERSION OF EXTRACTED USAGE RIGHT INTO LICENSE DATA UPGRADE LIST
S2102
END

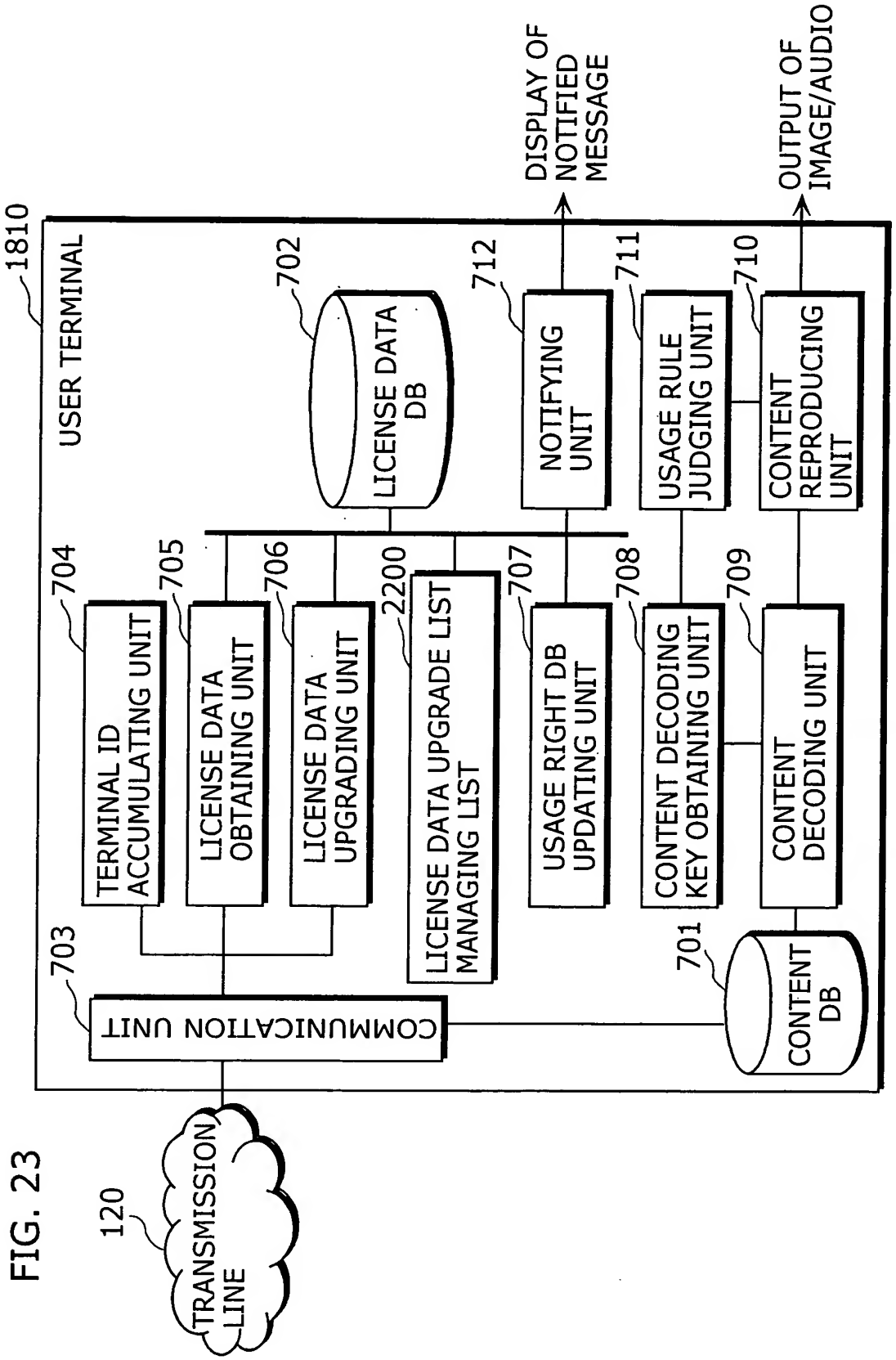

1810
USER TERMINAL
DISPLAY OF NOTIFIED MESSAGE
OUTPUT OF IMAGE/AUDIO
702
LICENSE DATA DB
712
NOTIFYING UNIT
711
USAGE RULE JUDGING UNIT
710
CONTENT REPRODUCING UNIT
704
TERMINAL ID ACCUMULATING UNIT
705
LICENSE DATA OBTAINING UNIT
706
LICENSE DATA UPGRADING UNIT
2200
LICENSE DATA UPGRADE LIST MANAGING LIST
707
USAGE RIGHT DB UPDATING UNIT
708
CONTENT DECODING KEY OBTAINING UNIT
709
CONTENT DECODING UNIT
703
COMMUNICATION UNIT
701
CONTENT DB
120
TRANSMISSION LINE

FIG. 23

FIG. 24

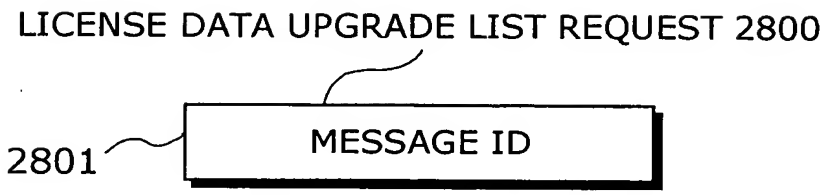


FIG. 25

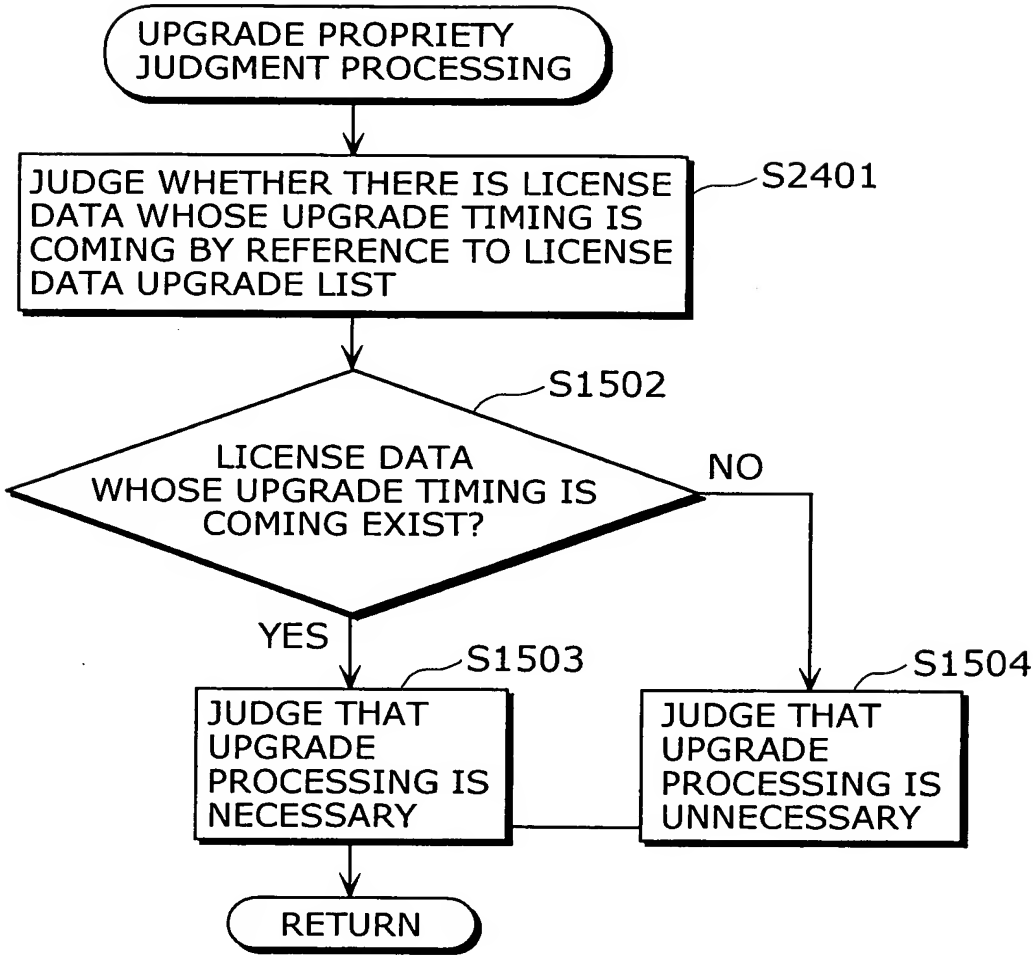

UPGRADE PROPRIETY JUDGMENT PROCESSING
JUDGE WHETHER THERE IS LICENSE DATA WHOSE UPGRADE TIMING IS COMING BY REFERENCE TO LICENSE DATA UPGRADE LIST
S2401
S1502
LICENSE DATA WHOSE UPGRADE TIMING IS COMING EXIST?
NO
YES
S1503
JUDGE THAT UPGRADE PROCESSING IS NECESSARY
S1504
JUDGE THAT UPGRADE PROCESSING IS UNNECESSARY
RETURN

FIG. 26

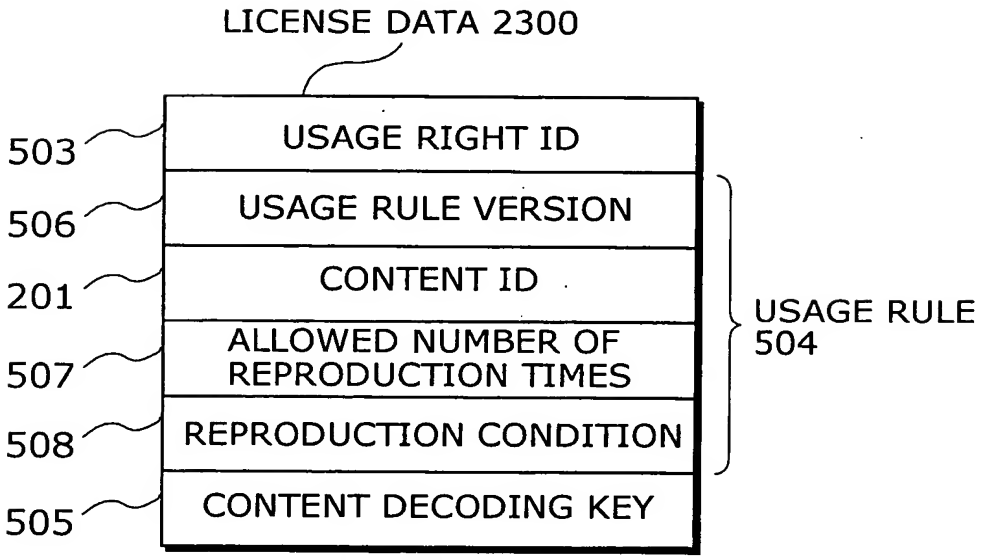

LICENSE DATA 2300
503
USAGE RIGHT ID
506
USAGE RULE VERSION
201
CONTENT ID
507
ALLOWED NUMBER OF REPRODUCTION TIMES
508
REPRODUCTION CONDITION
505
CONTENT DECODING KEY
USAGE RULE 504

FIG. 27

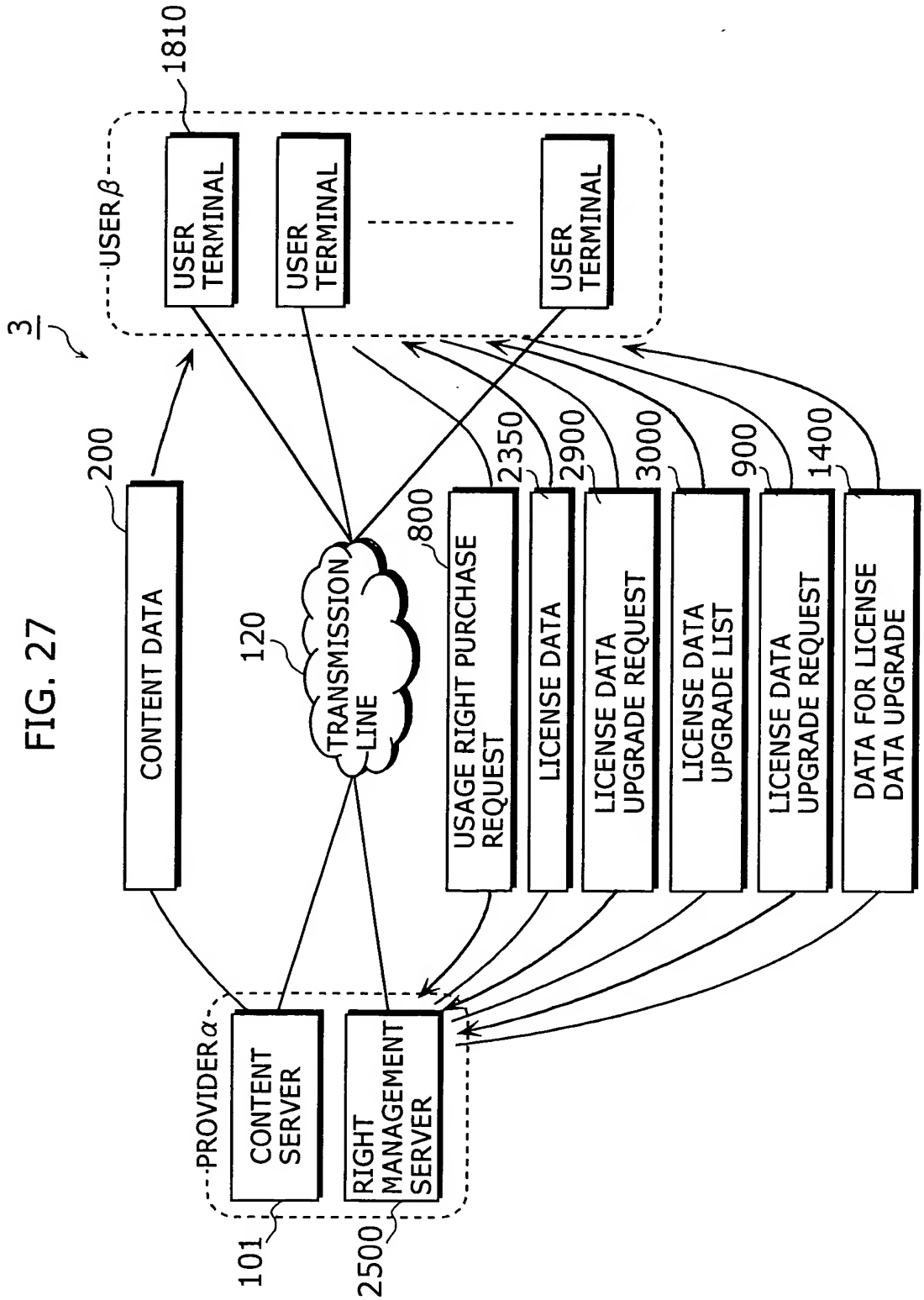

3
USER β
1810
USER TERMINAL
USER TERMINAL
USER TERMINAL
200
CONTENT DATA
120
TRANSMISSION LINE
800
USAGE RIGHT PURCHASE REQUEST
2350
LICENSE DATA
2900
LICENSE DATA UPGRADE REQUEST
3000
LICENSE DATA UPGRADE LIST
900
LICENSE DATA UPGRADE REQUEST
1400
DATA FOR LICENSE DATA UPGRADE
PROVIDER α
CONTENT SERVER
RIGHT MANAGEMENT SERVER
101
2500

FIG. 28

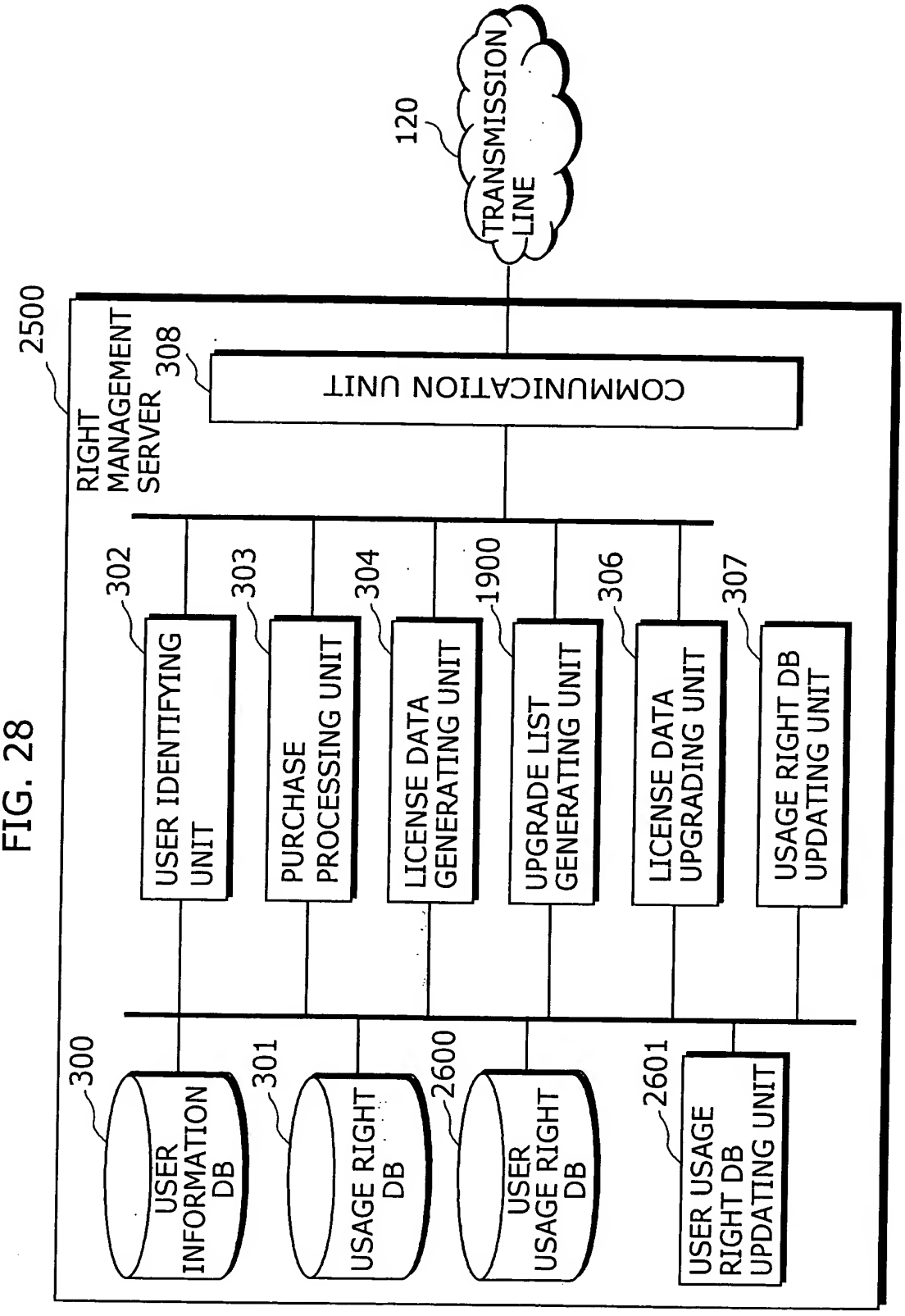

120
TRANSMISSION LINE
2500
RIGHT MANAGEMENT SERVER
308
COMMUNICATION UNIT
302
USER IDENTIFYING UNIT
303
PURCHASE PROCESSING UNIT
304
LICENSE DATA GENERATING UNIT
1900
UPGRADE LIST GENERATING UNIT
306
LICENSE DATA UPGRADING UNIT
307
USAGE RIGHT DB UPDATING UNIT
300
USER INFORMATION DB
301
USAGE RIGHT DB
2600
USER USAGE RIGHT DB
2601
USER USAGE RIGHT DB UPDATING UNIT

FIG. 29

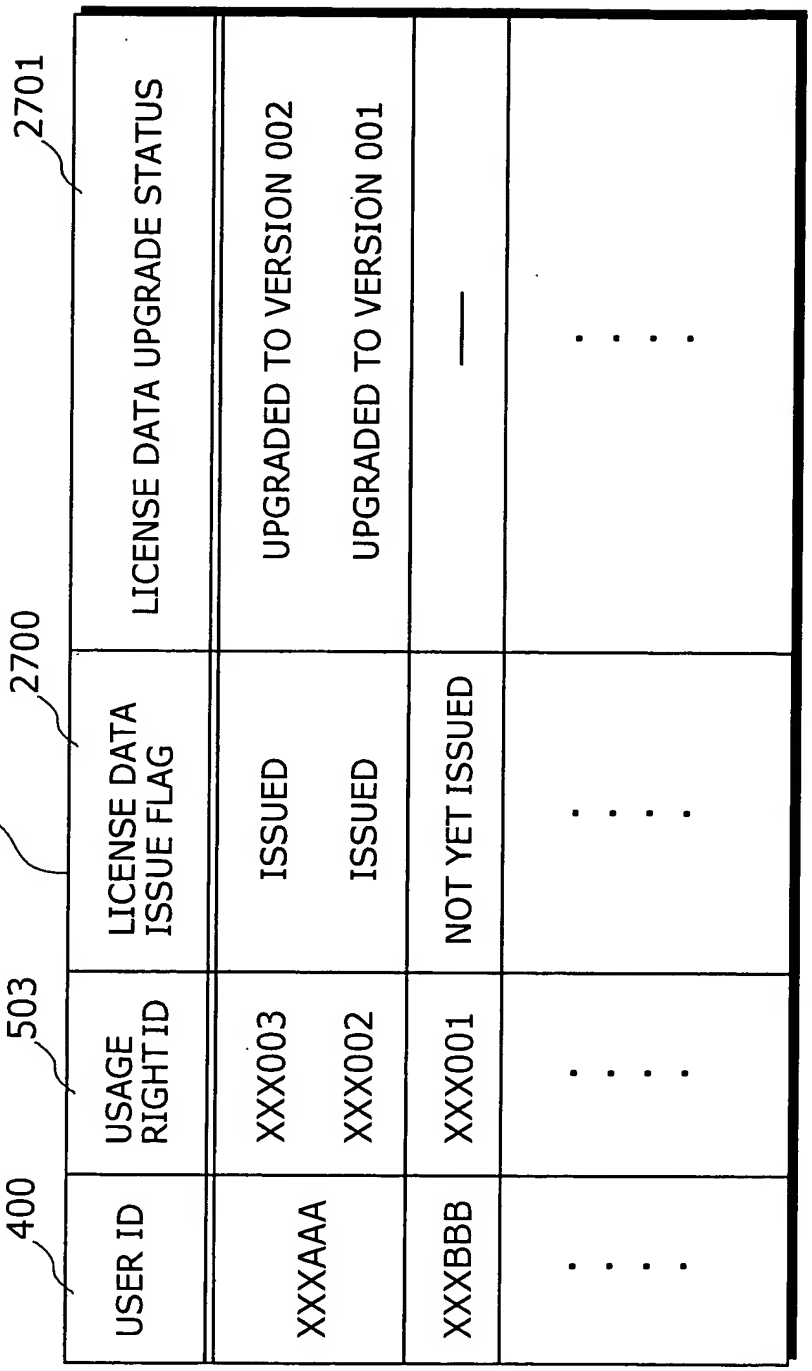

USER USAGE RIGHTDB2600
400
503
2700
2701
USER ID
USAGE RIGHT ID
LICENSE DATA ISSUE FLAG
LICENSE DATA UPGRADE STATUS
XXXAAA
XXX003
ISSUED
UPGRADED TO VERSION 002
XXX002
ISSUED
UPGRADED TO VERSION 001
XXXBBB
XXX001
NOT YET ISSUED
—

FIG. 30

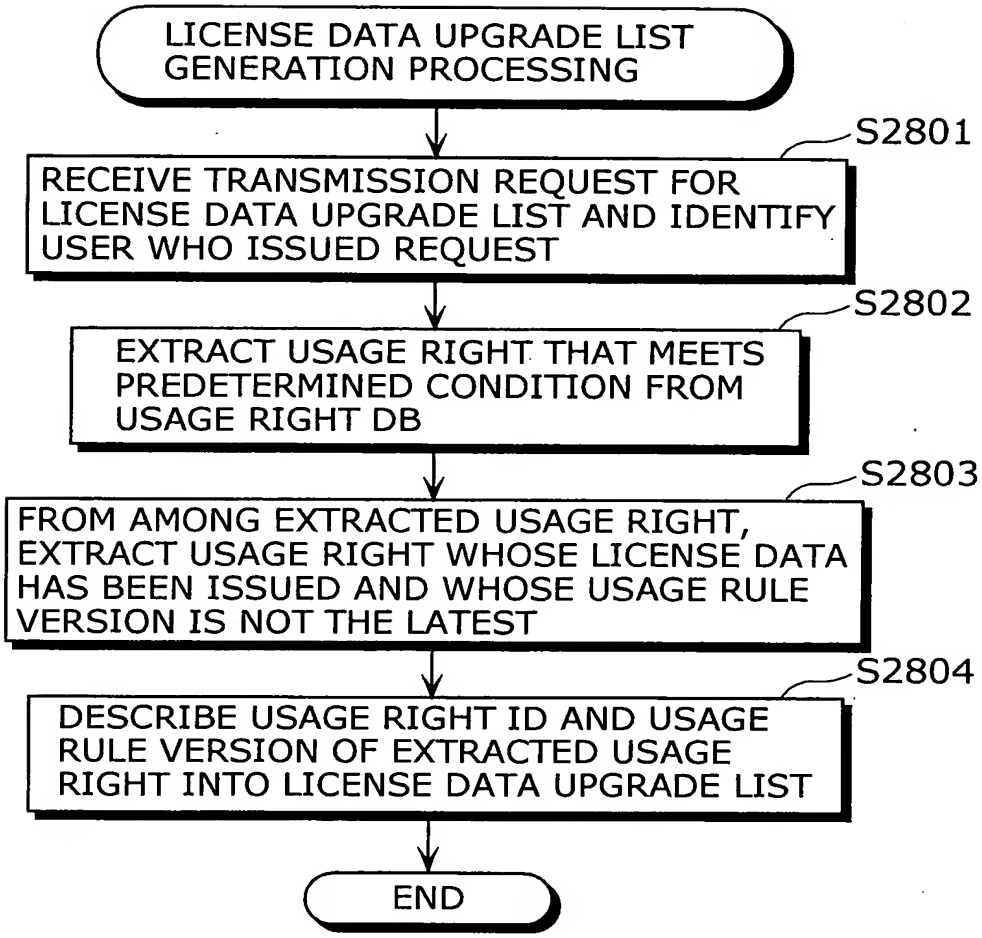

LICENSE DATA UPGRADE LIST GENERATION PROCESSING
S2801
RECEIVE TRANSMISSION REQUEST FOR LICENSE DATA UPGRADE LIST AND IDENTIFY USER WHO ISSUED REQUEST
S2802
EXTRACT USAGE RIGHT THAT MEETS PREDETERMINED CONDITION FROM USAGE RIGHT DB
S2803
FROM AMONG EXTRACTED USAGE RIGHT, EXTRACT USAGE RIGHT WHOSE LICENSE DATA HAS BEEN ISSUED AND WHOSE USAGE RULE VERSION IS NOT THE LATEST
S2804
DESCRIBE USAGE RIGHT ID AND USAGE RULE VERSION OF EXTRACTED USAGE RIGHT INTO LICENSE DATA UPGRADE LIST
END

FIG. 31

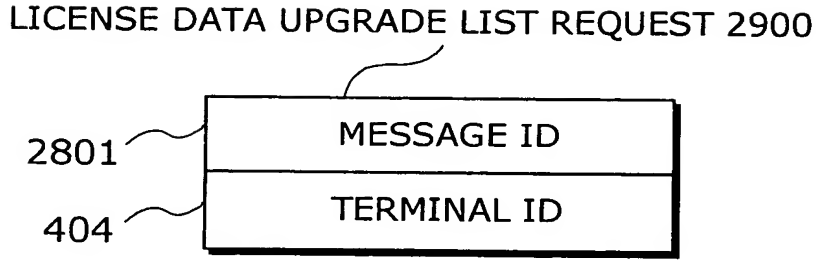
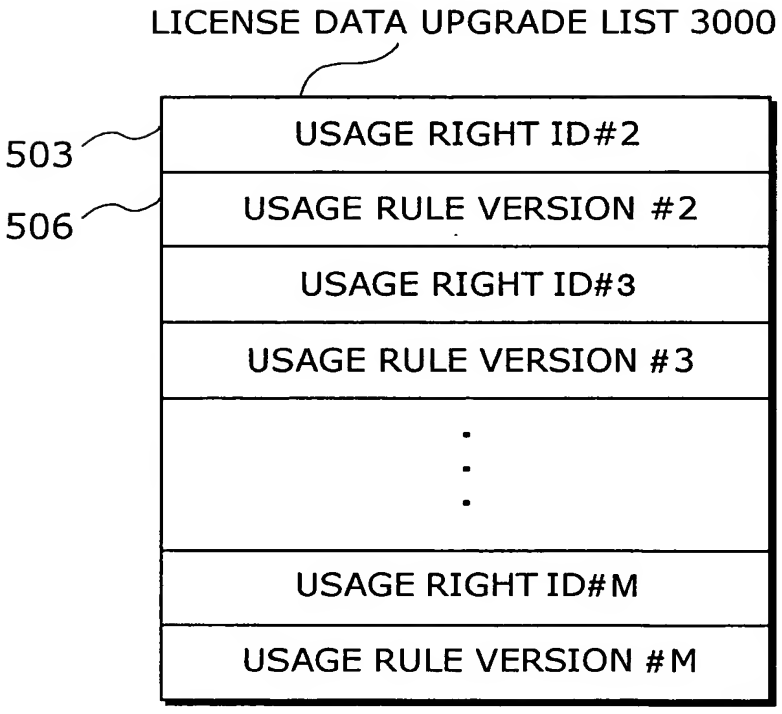

LICENSE DATA UPGRADE LIST REQUEST 2900
2801
MESSAGE ID
404
TERMINAL ID

FIG. 32


LICENSE DATA UPGRADE LIST 3000
503
506
USAGE RIGHT ID#2
USAGE RULE VERSION #2
USAGE RIGHT ID#3
USAGE RULE VERSION #3
USAGE RIGHT ID#M
USAGE RULE VERSION #M